



RESEARCH HIGHLIGHTS



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THE COST OF FLEXHOUSING™

FlexHousing is affordable, adaptable and accessible housing. It takes extra planning time, but the pay-off is a comfortable home that will satisfy the occupants' changing needs over its lifetime. This project shows the breakdown of costs involved in building with many of the FlexHouse options, as well as the cost to renovate an existing house to give it those qualities. Costs were determined in Saskatoon in 2002.

What makes a FlexHouse Flexible?

FlexHousing concepts address more than just mobility issues. Using extra space more efficiently may permit a future in-law or revenue suite, a wise idea that literally pays the homeowner back! Previous documents written by CMHC including "FlexHousing, Homes that Adapt to Life's Changes" and "FlexHousing, The Professionals' Guide" reveal that FlexHousing is achievable.

Our FlexHousing costing reflects a "move-up" home. We have concentrated on features that would make this home more accessible and adaptable over time. Our costing detail reveals that most of these features are inexpensive, and easily incorporated. This makes FlexHousing an efficient approach to home construction.

We feel that the Basic FlexHousing principles can be introduced to a greater or lesser extent depending on the perceived need; for example, provision for an attic expansion may be worth considering in some markets but not in others.

Living in our FlexHouse

Imagine an established family who purchases our FlexHouse after living in a smaller starter home or condo. The three-bedroom house has three bathrooms: two three-piece baths upstairs plus a two-piece bathroom on the main floor. The laundry room is located on the second floor for convenience. The use of special trusses provides the opportunity for a livable attic. The basement is also unfinished but is roughed-in for plumbing and electrical with private access at the side of the house.

The established family invites their parents to live with them. The grandparents graciously decline for now and the family uses the living room as a home office. Later, the family completes the bonus room with a two-piece bathroom to allow for a bedroom, home office or games room. The basement is finished as a two-bedroom apartment complete with a full three-piece bath, kitchen and laundry for their teenager or as an income-producing unit. This allows the family full use of the house.

The children eventually move out and our couple rents out the basement suite as a revenue property. The remaining grandparent becomes more dependant and decides to move in. The elevator is installed. As the couple age, they hire a live-in home care worker to help with the care of the grandparent. The home care worker has the private suite in the basement and can be near when required.



This scenario demonstrates the full use of the FlexHouse concepts throughout the lifespan of one family. We trust that our study will show that FlexHousing is accessible, adaptable and affordable.

Benchmark Home

We based our Benchmark house on a popular 162 sq. meter (1743 sq ft) plan. Tartan Homes of Ottawa provided us with a preliminary drawing and we have ensured that our specification list includes the same standard finishes. This plan was chosen because it has a floor plan that builders, particularly in Ontario, consider a “good seller”.

Thanks to CADvantage of Saskatoon, the plans were modified slightly to allow for a covered deck off the back door. The back wall of the house was extended to allow extra room in the kitchen and family room. It provides space for the side entry into the basement but the main bathroom is between floors.

Our Benchmark Plan is now 173 sq meters (1863 sq ft)

The main floor has a covered porch entryway with a hallway and archway into the living room that is spacious and can be renovated into an office/den or a bedroom if needed. The kitchen is U-shaped with ample cupboard space and the family room is large and has a fireplace. The dining room is also a great space for entertaining.

The Benchmark home is built with the following standard features:

- 813 mm (32 inch) doors
- Standard light switches and wall plugs
- No reinforced walls
- Standard weight Berber carpet and linoleum
- Locks and hardware are good quality, but standard knob style
- Windows are casement style with mid-grade energy efficiency and have locks and operators that are easy to use
- The furnace, hot water tank and thermostat controls are all mid-grade to high efficiency

The cost of the Benchmark House is \$143,072.00. This is our base price that is used to compare costs within this project. This price does not include taxes since provincial tax varies from province to province and GST may vary from a renovation to new construction.

Basic FlexHouse

This FlexHouse version of the benchmark house includes provision for those items that will make the house adaptable in the future to include a liveable attic space and/or a basement suite. Also it provides features that make the house more comfortable and easier to live in for those with limited mobility. Some of the features, such as wider doorways and wider hallways, will be present from day one while other features will only be roughed-in.

Entranceway

The front yard is graded to provide proper drainage away from the house and is landscaped to provide a pleasant, meandering path from the driveway sidewalk to the front door. By using berms, we have gradually raised the level of the path, so that there is no need for any steps, thereby making it comfortable for those who cannot manage stairs. The covered entrance protects the flush threshold from the elements and shelters those arriving.

Doors and Thresholds

All doors are a minimum 865 mm (34 inch) wide and have lever-style door handles. The front door has a side window panel at the door. This allows anyone to check who is at the door before it is opened and does not require a peephole. The locks and bolts are easy to secure. A closet at the entrance is convenient. The exterior thresholds are under 19 mm (3/4 inch) in height to provide easy, unencumbered access to both the front and back porches. Because our plan has open archways, the main floor feels spacious and provides lots of room for maneuvering.

Electrical

All light switches are placed 840 mm (33 inches) from the floor and electrical outlets are installed 450 mm (18 inches) from the floor throughout the house. There is no additional cost to provide wiring in these convenient locations.

Bathrooms

The main bathroom is raised so that it is level with the main floor. A storage shelf is installed along the wall of the bathroom to provide added open storage for household supplies. Single levered faucets are used although some people find two-lever faucets less confusing. Pedestal style and wall mounted bathroom sinks are chosen and installed at construction, as they are easy to use from a seated position.

The second floor bathrooms are constructed so that the main bathroom has a 910 mm (36 in) door and is easily accessible. The two bathrooms have been reconfigured from the Benchmark plan so that the master bathroom can be renovated in the future for a walk-in shower with wet floor and drain. By planning ahead, this floor plan ensures that renovations in the future are economical.

Reinforcements

Walls in all the bathrooms are reinforced with 19 mm (3/4 inch) plywood. This will allow easy installation of grab bars to meet the needs of all occupants in the future.

Handrails

Walls in the stairway are reinforced to permit easier installation of extra handrails or a future stair lift. We felt that since most houses do not have reinforced walls (this adds minimal cost at the time of construction) it was an important safety issue. The handrails are placed between 813 mm (32 in) and 920 mm (36 in) above the nosing. The railing is oval in shape and 30 mm (1-1/4 in) in diameter.

Bedrooms

All bedrooms have closet space. The master bedroom has an ample walk-in closet, and a storage closet that could be used as an elevator shaft if needed in the future.

Laundry room

The laundry room is relocated from the stairwell to its own closet on the second floor. The plan includes the cost of plumbing and electrical to this area. This location is more convenient for everyone.

Private Entrance to Basement

By planning and constructing the main floor bathroom and the laundry room in their new locations, we now have an area for the private entrance to the basement suite, if the basement suite option is taken in the future. We have built a clothes closet at this entrance for extra storage.

Kitchen

The U-shaped kitchen is a maneuverable area thanks to our Benchmark house design. Electrical outlets are installed on the front of cabinets. The sink drain is lower at installation to allow the kitchen sink height to be easily changed in the future. Walls are reinforced with 19 mm (3/4 in) plywood to allow for the lowering of the sink and cook-top. Cabinets have D-shaped handles for convenience. A wall oven is installed beside the pantry or refrigerator.

Rough-in for Elevator

Providing the possibility for safe access to all levels for those who cannot easily and safely manage stairs is an important issue for the future. Consequently, the plan provides space for the installation of a home elevator, wall reinforcement, as well as the extra electrical wiring that may be required. The pit is located in the concrete of the basement floor allowing access to all main floors and the basement and helping contain the sound of the hydraulics, making the lift very quiet. This may be an important issue for an occupant in the basement suite.

Rough-in for Basement Suite

Everything a self-contained in-law suite needs is roughed-in at this time including electrical, cable, internet, and telephone lines. The kitchen plumbing and venting are roughed-in. Future needs for a three-piece bathroom, as well as heating and ventilation are roughed-in. Larger windows are installed to make this suite bright and inviting and to meet the bedroom escape requirements of the National Building Code. If this suite were to be occupied by someone unrelated to the family, the code would require a separate heating and air supply, sound separation, increased fire ratings etc.

Attic: Truss system and Bonus Room

To construct this home with provision for an attic bonus room, the entire roof design is changed from the Benchmark plan. This is relatively easy to do at time of construction, but is expensive to complete as a renovation. A vapour barrier and insulation is installed.

The stairs leading to the bonus room are roughed-in. All electrical, cable, internet, and telephone lines are roughed-in. The two-piece bathroom with exhaust fan vented out, heating and ventilation are planned and a window is roughed-in.

Basic FlexHouse Cost Analysis

Costs of Basic FlexHouse features	\$ 7,833.00
Cost of Benchmark	\$143,072.00
Total Cost of Basic FlexHouse	\$150,905.00
5.5% over the cost of the Benchmark House	
2.0% if normal attic trusses are used	

The cost increase from the Benchmark plan is due to constructing the home with all the basic FlexHouse concepts. These are improvements that will dramatically affect the usefulness of this house in the future. The small increase in cost provides the owners with features that are more convenient from day one, and will save money and reduce stress in the future when renovations are needed so the occupants can continue living in the home in their senior years.

Renovating a Basic FlexHouse to a Full FlexHouse

Pricing renovations is a risky business for a builder. The unforeseen problems can seem endless and can easily run a project over budget. If the builder knows the house, or perhaps has built the house originally, it helps a tremendous amount.

Our costs do not include a mark-up for contingency problems that happen during a renovation. We have charged a mark-up that is higher than our new housing construction, which is normal procedure.

This renovation puts into action all the FlexHouse elements of accessibility and expandability.

Elevator

The elevator is installed. The garage storage room and the master bedroom storage closet are replaced to hold the working elevator. New doors are installed in the garage, the master bedroom, and basement as part of the elevator installation.

Bathrooms

The toilet in the main floor bathroom is moved to make this bathroom more accessible. We take space from the side entry closet to expand this room. The master bathroom on the second floor has the tub removed so that a wet-floor with drain can be used as a walk-in shower in its place. The pedestal sink is moved to allow for more maneuverability. The second floor main bathroom remains untouched as it was constructed accessible at the Basic FlexHouse stage. The pre-planning of this room saves a tremendous amount of time and money in bathroom renovations.

Kitchen

The kitchen sink is lowered easily as the drain line was installed lower at the time the Basic FlexHouse was constructed. The cook-top is lowered; cupboard doors are removed from underneath the sink and cook-top to accommodate a seated person.

Because the Basic FlexHouse is well planned at construction, the renovation to Full FlexHouse is relatively painless in terms of renovation time, waste and disarray. The main cost of the renovation is in the elevator. The reinforcing of bathroom and kitchen walls allows for the re-hanging of sinks and cupboards without a lot of work or untidiness. The homeowners will find that this renovation is relatively trouble-free and is an attainable reformation.

Attic

The attic is converted into the finished bonus room. Because our Basic FlexHouse planned for this potential expansion, the open trusses make this job achievable. Installing the stairwell from the second floor to the attic will be very challenging and is considered a difficult job. The walls and ceilings are insulated, dry-walled and painted. The two-piece bathroom is finished. The flooring and lighting are installed. The window will be larger in order to accommodate the sheets of four-foot drywall that will be delivered through this window. The completed Bonus Room provides 32.3 m^2 (348 sq ft) of additional living space

Basement suite

The basement is finished as a 748 square foot 2-bedroom unit with kitchen, bathroom, laundry and living room areas. The side entrance closet is reconfigured to provide a half-closet where boots and shoes are placed. It is an effective way of using what would have been wasted space. Plumbing and venting are completed. The unit is dry-walled, painted and light fixtures and flooring complete the job. (If this suite were to be occupied by someone unrelated to the family, it would require the code features mentioned earlier.)

The Full FlexHouse is a very functional home and will accommodate even someone who requires wheelchair access. With the revenue potential to offset the cost of the renovation, this house plan is feasible. However, the attic conversion would only be useful to a family who truly needed the space. It will be a functioning bedroom, or office/play room, but it may be easier to renovate the family or living room on the main level than to expand into the attic. Again, because FlexHouse concepts are designed into the original plans, this renovation is uneventful and the homeowners will be pleased with the results.

Costs to Renovate Basic FlexHouse

Without Elevator

Cost to Renovate	\$ 49,605.00
Original Cost of Basic FlexHouse	\$150,905.00
New Cost of Full FlexHouse	\$200,510.00
40.2% over the cost of the Benchmark	

Without Elevator

Without Attic Trusses

Cost to Renovate	\$ 28,663.00
Original Cost of Basic FlexHouse without trusses	\$145,982.00
New Cost of FlexHouse	\$174,644.00

With Elevator

Cost to Renovate	\$ 74,605.00
Original Cost of Basic FlexHouse	\$150,905.00
New Cost of Full FlexHouse	\$225,510.00

Project Manager: Thomas Parker

Research Report: *The Cost of FlexHousing™ 2002*

Consultants: Sun Ridge Group, Saskatoon

Housing Research at CMHC

Under Part IX of the *National Housing Act*, the Government of Canada provides funds to CMHC to conduct research into the social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research.

This fact sheet is one of a series intended to inform you of the nature and scope of CMHC's research.

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